

DEEPSEA LED FIXTURE SYSTEMS

DESCRIPTION:

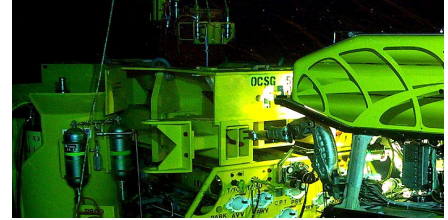
The DEEPSEA C Series marine underwater LED lights are engineered for long term immersion & deployment in severe and harsh environments. Available hot output of 560lm up to an incredible 240,000 lumen at 5000k CCT, with 10m to 6000 meters sea water rating, benchmark efficacy and practically indestructible housings that can operate both In-Air (IA) and In-Water (IW) modes.

Available in various power configurations with 10-2400W power levels to accommodate most applications including severe duty environments where vibration and shock are present. Power options include AC & DC including HV versions from 10-600V and 35-400Hz and DIM/ SYNC/STROBE controls. Light distribution is available on some models with 10-120° precision PC lenses.

The DEEPSEA C Series LED fixtures with on board digital drivers with power protection and thermal roll back provide stable performance and guard against lumen depreciation. FME compliant hardware and subsea cabling options provides robust & reliable performance under demanding conditions. DEEPSEA LED fixtures deliver exceptional engineering and best in class high efficacy LED engines from NICHIA™, CREE™, BRIDGELUX™ and Samsung™.

Housing materials include, stainless, bronze, brass, Titanium, Kovar, Niobium superalloys and hardened anodized Aluminium alloys. Available with Borosilicate glass, Polycarbonate (PC), Polymethyl methacrylate (PMMA) and Sapphire ports as options. Advanced surface treatment options include specialty coatings, hydrophobic, fluorocarbon, epoxy, ceramic and Tungsten. Molded synthetic polymer gaskets seals are available in silicone type or as Viton™, NBR, EPDM, Santoprene™ and copper as an option.

Hydrostatic Pressure Test reports are available and can be performed as per customer's protocols as per ASME or PED standards. Selection of the right underwater LED fixture is simplified and uncompromised with four different categories and 14 types of LED fixtures.



APPLICATIONS:

- Deep Ocean Surveying
- Offshore Oil & Gas & Renewable Energy
- Dry Docks
- Test Chambers
- Subsea Research & Exploration
- Propulsion & Projectile High Speed Camera Analysis
- Undersea Cable Inspection Systems
- Geophysics
- Work Class ROV
- Oceanographic & Environmental Research
- Commercial Diving Operations & NDT
- Defense Systems



C SERIES SPECIFICATIONS

FIXTURE SERIES	DEPTH RATED	HOUSING MATERIAL	FASCIA TYPE	AVAILABLE POWER	EXIT LUMEN RANGE	OPERATING VOLTAGE
SURF C	10 meters/ 32.8 ft (Sea water)	AL6061-T6, 304 Stainless	PMMA (Acrylic Poly (methyl methacrylate)), PC Polycarbonate	18-180W	560-2,500lm	10-32VDC 32-48VDC
SUB C	300 meters/ 984 ft (Sea water)	AL6066-T6, 304 & 63AA- electropolished AISA type 316 Stainless, Titanium	PMMA (Acrylic Poly (methyl methacrylate), PC (Polycarbonate), Borosilicate Glass Sapphire Port	10-100W	1,200-11,500lm	12-36VDC 32-48VDC
DEEP C	6000 meters/ 19,680 ft (Sea water)	Hard Anodized AL6082- T6	Polycarbonate (PC)	80-480W	5,000-30,000lm	24/130-300VDC AC90-250V 50/60Hz
MAR C	100 meters/ 328 ft (Sea water)	Cast & Machined Aluminium Alloy C46400 Naval Brass. Titanium Aluminium Alloy	Polycarbonate (PC), PMMA (Acrylic Poly (methyl methacrylate))	240-2400W	24,000-240,000lm	12-24VDC 120-420VDC AC85-305V 50/60Hz



SURF C Type A



Power	Lumen	Distribution	Voltage	Kelvin Temp CCT	Anodic Protection
18W	990lm	25 or 60 Deg.	10-32VDC	4000-6500K *	NO
Housing Material	Fascia	Cable Connector Housing	Cable Exit	Size	Weight (Air)
Anodized Aluminium ADC12	PMMA	No Gland only	Rear	Ø105mm x 3.18mm	1.5kg/3.3lbs

* SURF C Series LED fixtures are available with the following LED engines as an option, R, G, B, Y, A, W, UV, RGB, RBGA, RGBAW, RGBWUV.

SURF C Type B



Power	Lumen	Distribution	Voltage	Kelvin Temp CCT	Anodic Protection
27-45W	1200-1700lm	25 or 60 Deg.	10-32VDC	4000-6500K *	NO
Housing Material	Fascia	Housing Cable Connector	Cable Exit	Size	Weight (Air)
304 Stainless	PMMA	Gland only	Rear	Ø119mm x 27.5mm	1.2kg/2.6lbs

* SURF C Series LED fixtures are available with the following LED engines as an option, R, G, B, Y, A, W, UV, RGB, RBGA, RGBAW, RGBWUV.

SURF C Type C



Power	Lumen	Distribution	Voltage	Kelvin Temp CCT	Anodic Protection
36-60W	1500-2500lm	25 or 60 Deg.	10-32VDC	4000-6500K *	NO
Housing Material	Fascia	Housing Cable Connector	Cable Exit	Size	Weight (Air)
304 Stainless	PMMA	Gland only	Rear	L210mm x W90mm x D30mm	1.6kg/3.5lbs

* SURF C Series LED fixtures are available with the following LED engines as an option, R, G, B, Y, A, W, UV, RGB, RBGA, RGBAW, RGBWUV.





SURF C Type D



Power	Lumen	Distribution	Voltage	Kelvin Temp CCT	Anodic Protection
45W	3200lm	120-140 Deg.	10-32VDC	4000-6500K *	NO
Housing Material	Fascia	Cable Connector Housing	Cable Exit	Size	Weight (Air)
316 Stainless	PC Polycarbonate	No Cable only	Rear	L230mm x W52mm x D16mm	1.1kg/2.45lbs

* SURF C Series LED fixtures are available with the following LED engines as an option, R, G, B, Y, A, W, UV, RGB, RBGA, RGBAW, RGBWUV.

SURF C Type E



Power	Lumen	Distribution	Voltage	Kelvin Temp CCT	Anodic Protection
180W	9000lm	120-140 Deg.	10-32VDC	4000-6500K *	NO
Housing Material	Fascia	Cable Connector Housing	Cable Exit	Size	Weight (Air)
316 Stainless	PC	No Cable only	Rear	L180mm x W84mm x D20mm	1.85kg/4.07lbs

* SURF C Series LED fixtures are available with the following LED engines as an option, R, G, B, Y, A, W, UV, RGB, RBGA, RGBAW, RGBWUV.



SUB C Type A



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
15-100W	1200-11,500lm	30 or 90 Deg.	YES Optional	12-36VDC	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
304 & 63AA- electropolished AISA 316 Stainless or Titanium	PMMA, PC or Borosilicate Glass Sapphire Port	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Rear	Ø74mm x 95mm	1.9kg/4.1lbs

SUB C Type B



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
15-100W	1200-11,500lm	30 or 60 Deg.	YES Optional	12-36VDC	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
304 & 63AA- electropolished AISA 316 Stainless or Titanium	PMMA, PC or Borosilicate Glass Sapphire Port	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Rear	Ø68mm x 136mm Ø120mm x 240mm	3.8kg/8.3lbs

SUB C Type C



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
15-100W	1200-11,500lm	75 –90 Deg.	YES Optional	12-36VDC	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
AL6066-T6, 304 & 316 Stainless	PMMA, PC or Borosilicate Glass Sapphire Port	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Rear	Ø75mm x 90mm	2.8kg/6.1lbs

SUB C Type D



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
15-100W	1200-11,500lm	75 –90 Deg.	YES Optional	12-36VDC	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
AL6066-T6, 304 & 316 Stainless	PMMA, PC or Borosilicate Glass Sapphire Port	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Rear	Ø80mm x 130mm	2.6kg/5.7lbs

LEDRAYS offers the following dimming options (Please note not all DIM/SYNC/STROBE/DATA drive methods apply to a particular product)

DIM Control: 0-5V, 0-10V, 1-10V, 0-20ma, 4-20ma, RS485, RS-232, PWM, RES, LEDIM, TEDIM, DMX512, DMX512/RDM, DALI, Custom

* Not incl. Bulkhead connector or support systems





DEEP C Type A



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
80-120W	5000-7,500lm	40 or 90 Deg.	YES Optional	24VDC 90-130VAC 50/60Hz	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
Hard Anodized Aluminium AL6082-T6	PMMA (Acrylic Poly (methyl methacry- late)	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Rear Top Bottom Side	L132mm x W88mm x D77mm	1.6kg/3.5lbs

DEEP C Type B



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
120-254W	9,500-22,000lm	90 Deg.	YES Optional	100-250VAC 50/60Hz 130-300VDC	6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
Hard Anodized Aluminium AL6082-T6	PMMA (Acrylic Poly (methyl methacry- late)	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Rear Top Bottom Side	L171mm x W102mm x D52mm	1.8kg/4.0lbs

DEEP C Type C



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
350-480W	22,000-30,000lm	80x80 Deg.	YES Optional	90-240VAC 50/60Hz 24-48VDC	6500K	80
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
Hard Anodized Aluminium AL6082-T6	PMMA (Acrylic Poly (methyl methacry- late)	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Top	L432mm x W331mm x D178mm	2.5kg/5.5lbs

LEDRAYS offers the following dimming options (Please note not all DIM/SYNC/STROBE/DATA drive methods apply to a particular product)

DIM Control: 0-5V, 0-10V, 1-10V, 0-20ma, 4-20ma, RS485, RS-232, PWM, RES, LEDIM, TEDIM, DMX512, DMX512/RDM, DALI, Custom

* Not incl. Bulkhead connector or support systems



MAR C Type A



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
140-240W	14,000-24,000lm	120 Deg.	YES Optional	12-24VDC 120-420VDC AC85-305V 50/60Hz	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
Cast and Machined Aluminium Alloy	PC Polycarbonate	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Top/Rear	Ø437mm x 115mm	24.3kg/53.5lbs

MAR C Type B



Power	Lumen	Distribution	DIM Control	Voltage	Kelvin Temp CCT	CRI
240-2400W	24,000-240,000lm	360 Deg.	YES Optional	12-24VDC 120-420VDC AC85-305V 50/60Hz	4000-6500K	80-90
Housing Material	Fascia	Bulkhead Connector	Anodic Protection	Cable Exit	Size *	Weight (Air)
C46400 Naval Brass, Titanium Aluminium Alloy	PMMA (Acrylic Poly (methyl methacrylate))	Seacon MSBH Subconn BH BIRNS Poly G Crouse Hinds	YES Optional	Top	Ø70mm x 135mm	0.9kg/1.98lbs
					Ø70mm x 195mm	1.2kg/2.64lbs
					Ø70mm x 255mm	1.4kg/3.08lbs
					Ø70mm x 375mm	1.6kg/3.52lbs
					Ø70mm x 435mm	1.8kg/3.96lbs
					Ø70mm x 495mm	2.0kg/4.40lbs
					Ø70mm x 565mm	2.2kg/4.84lbs
					Ø70mm x 615mm	2.4kg/5.28lbs
Ø70mm x 675mm	2.6kg/5.72lbs					

LEDRAYS offers the following dimming options (Please note not all DIM/SYNC/STROBE/DATA drive methods apply to a particular product)

DIM Control: 0-5V, 0-10V, 1-10V, 0-20ma, 4-20ma, RS485, RS-232, PWM, RES, LEDIM, TEDIM, DMX512, DMX512/RDM, DALI, Custom

* Not incl. Bulkhead connector or support systems or support systems



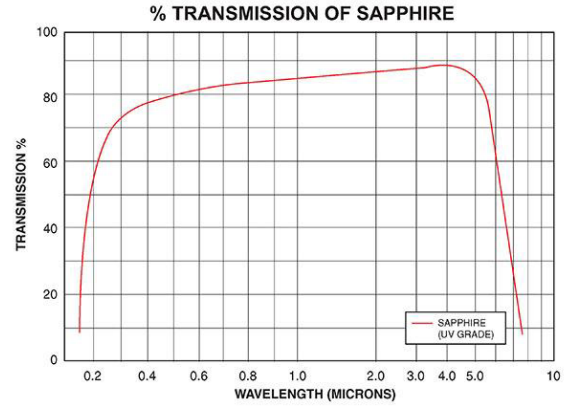
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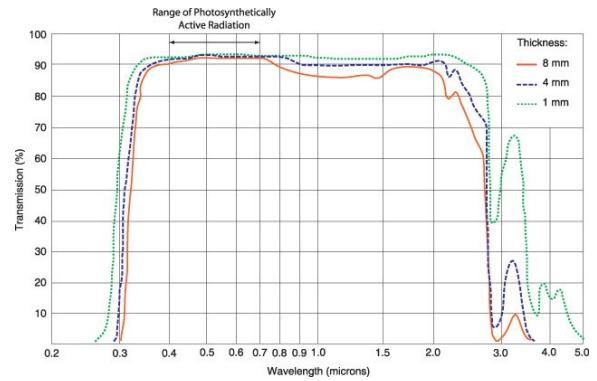
Sapphire

Chemical Properties	
Crystal structure	Hexagonal
Chemical formula	Al ₂ O ₃
Purity	99.997% Al ₂ O ₃
Density	3.98g/cm ³
Physical Properties	
Hardness	Mohs 9
Tensile strength	0,4 GPa at 25 °C
Compressive strength	2,1 GPa at 25 °C
Bending strength	0,6 GPa at 25 °C
Elasticity modulus Yong E	4,6-102GNm
Thermal Properties	
Application temperature	2000°C
Melting point	2053°C
Thermal conductivity	42 W.m-1.K-1
Thermal expansion	6.6.10-6. °C-1 (20-50°C) parallel to C 5.0x10-6 C-1 (50°C) perpendicular to C
Thermal capacity	0.08 cal cm-1 s-1 °C-1 (25°C)
Specific heat	0.18 cal g-1 °C-1 (25°C)
Optical Properties	
Refractive Index	1,8 (@0.3μ), 1,6 (@5μ)
Optical transmission	to 97% in 0.15 - 6 u
Electrical Properties	
Specific resistance	1011 ohms/cm at 500°C
Dielectric strength	480kV cm-1 (60 Hz.)
Dielectric loss index	0.000030 parallel to C axis



Borosilicate Glass

Physical Properties	Metric	English
Density	2.40 g/cc	0.0867 lb/in ³
Mechanical Properties		
Knoop Microhardness	4.1	4.1
Modulus of Elasticity	60.0 - 64.0 GPa	8700 - 9280 ksi
Fracture Toughness	0.770 MPa-m ^{1/2}	0.701 ksi-in ^{1/2}
Thermal Properties		
CTE, linear	4.00 μm/m-°C @Temperature 0.000 - 300 °	2.22 μin/in-°F @Temperature 32.0 - 572 °F
Thermal Conductivity	1.10 W/m-K	7.63 BTU-in/hr-ft ² -°F
Melting Point	800 °C	1470 °F
Component Elements Properties		
Al ₂ O ₃	2.0 - 7.0 %	2.0 - 7.0 %
B ₂ O ₃	7.0 - 13 %	7.0 - 13 %
Na ₂ O or K ₂ O	4.0 - 8.0 %	4.0 - 8.0 %
SiO ₂	70 - 81 %	70 - 81 %



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